many touches of dry humour. This part of the work is of high value, as the notes on the country, the sketches of the life of the people, and the account of the incidents of the march, enable one to form a clear and true idea of the present condition of British East Africa.

The second group of chapters (Nos. x., xi., xii., xviii. and xx.) are devoted to the discussion of general topics. These, taken in order of length, and beginning with the longest, deal with transport, meteorology and climate, outfit, botany and geology. The great length at which transport is treated, and the brevity of the chapter on botany, remind us of the main disappointment of the book. It is entitled "A Naturalist in Mid-Africa"; but, unfortunately, there is in it more about politics than about nature. The author is the only botanical expert who has travelled in British East Africa since Hildebrandt's journey to Ukamba, in 1877, and hence results of the highest importance might be expected from his labours. The chapter on botany is devoted to an attempt to explain the present distribution of the Africa floras. He assumes first, that in Miocene times a sea stretched "across the whole of the desert country which now extends from Beluchistan to the Atlantic, between Morocco and Senegal." But it is practically certain that no such sea has existed since at least Palæozoic times. The second assumption is a use of Körner's thermal constants, to which the author appeals to prohibit the movement of plants along certain directions, and to produce variation by a factor which is almost the same as Romanes' physiological selection. He tells us that in the Victoria Nyanza region, "the rainy season is from October to April. It follows from this that the plants there could not have come from the Congo area, for their climate is a very wet one, and their rainy season is from April to October."

If we are not always converted to Mr. Scott Elliot's theories, we always enjoy his sketches of wild life and of nature. He is seen at his best as an observer. The spirit of the true naturalist comes out in his sketches of life in the woods and on the hillside ; and some of his observations, such as on the original limits of the Victoria Nyanza and on the shapes of the valleys of the upper streams of the Nile basin, are of great interest and value. He is always happier when speaking of plants and describing the habits of animals, than when dealing with men. Mr. Scott Elliot takes things sadly, and his quiet humour brings into relief the spirit of sadness that pervades the book. He draws a dismal picture of the conditions of life with a small expedition in Equatorial Africa; and then remarks that on his return people always asked him, "Did you enjoy yourself?" He appears to have been ill-used during his expedition by the officials of both the British East Africa Company and of the German territories. He repeatedly complains that naturalists at home are very inconsiderate of the difficulties of collectors. He grieves that his meteorological notes are of little service, for, as usual, "in the interval between my departure and return, quite new instruments and observations were found to be absolutely essential." In his dedication he describes his book as the "result of a most inconvenient love of botany." In his preface he regrets that he cannot use the map of Ruwenzori prepared from his materials by the Geographical Society, "as several inaccuracies were retained in deference to a more recognised authority than myself." He deplores that "insects are usually collected by travellers, but it is difficult to obtain any information about them in this country." Mr. Scott Elliot's complaint appears to be that the collections of English travellers are not described as thoroughly or as well as those of Germans, and that in consequence there is little inducement to Englishmen to undertake scientific exploration.

There are so few men willing to run the risks and spend their money in this work, that we greatly hope that Mr. Scott Elliot's complaints are not to be taken as proof of a widespread evil. British naturalists have exceptional opportunities for obtaining rich harvests of material from abroad; but owing to the neglect of systematic zoology and botany in our educational centres, the number of trained labourers who can work at them is far too few. The loss to science is no doubt very serious ; but as it is impossible for a single collector to collect everything, a traveller can protect himself by devoting his attention to groups in which he knows that his materials will not be wasted.

ANALYTICAL CHEMISTRY.

Analytical Chemistry. By N. Menschutkin. Translated from the third German edition by James Locke. Pp. xii + 512. (London: Macmillan and Co., 1895.)

THERE is, perhaps, hardly any branch of chemistry so overstocked with text-books as that of analysis. In the work before us, however, the subject is presented in such a clear and original manner, that it can hardly fail to become as popular in this country as in Germany, where it has already reached a third edition.

In the preface the author states that although general and analytical chemistry are usually commenced together, yet, in his opinion, the study of the former should always precede that of the latter, the best order of attack being general, analytical, organic, and finally physical chemistry. In view of the difference of opinion in this country as to the best lines to follow in the elementary teaching of chemistry, the following remarks of Prof. Menschutkin are of sufficient interest to quote in full.

"The student cannot rightly turn to analytical chemistry until he has obtained a thorough preparation in the general science ; and his knowledge of the latter is measured, not by the number of single and isolated facts with which he is familiar, but by the clearness with which he understands the fundamental chemical phenomena and theories. For these reasons I strongly advise the beginner not to devote himself too quickly to analytical chemistry, and my advice is justified by the character which its study must assume if it is to be of value."

Rather more than half of the book deals with qualitative analysis. The metals are grouped, as usual, according to the properties and modes of formation of their sulphides. Under the heading "General reactions," the corresponding compounds of all the methods of a group are given, and then, as "Special reactions," follow the properties of the chief compounds of each element used in analysis. Especial stress is laid upon the fact that every analytical reaction depends upon definite conditions, which must be known and fulfilled for the suc-

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cessful performance of any given separation. The analysis of these conditions is one of the most admirable features of the book, complete explanations being given in all cases where the theory of the reactions is known (as in the separation of nickel and cobalt); conditions found to be necessary by experience, for which no theoretical reason can be given, are definitely stated to be empirical. One point emphasised here, to which no reference is made in our current text-books, has reference to the composition of the metallic sulphides obtained in the wet way. It is pointed out that the anhydrous sulphides as obtained in quantitative analysis differ considerably in their properties (colour, rate of oxidation) from the precipitates obtained in the ordinary course of qualitative work, and these differences of behaviour correspond to differences in composition. Thus the precipitates obtained with hydrogen and ammonium sulphides are in many cases hydrated sulphides (R(SH)(OH) rather than RS). The anhydrous sulphides are occasionally formed in solution, and might give rise to confusion in certain cases. Thus, whilst the ordinary hydrated sulphide of manganese is yellow or flesh-coloured, in presence of an excess of ammonia and ammonium sulphide a green precipitate of anhydrous manganous sulphide is sometimes formed, especially from hot solutions. Again, the black precipitate obtained by treating cupric solutions with hydrogen sulphide is Cu_4S_3, and not CuS, as usually stated, the latter substance, according to Prof. Menschutkin, being unknown.

The analytical properties of the rarer metals are briefly treated in separate chapters. It would have added much to the scientific value of the book if this artificial distinction between ordinary and so-called "rare" metals could have been dispensed with. The present stereotyped mode of treatment is the chief cause of the want of knowledge by the average student of the properties and reactions of metals such as gold, platinum, cerium, uranium, and others that can only be conventionally considered as "rare."

The second half of the book deals with quantitative analysis. The descriptions are concise and the methods well chosen, but are hardly sufficiently detailed for the beginner.

OUR BOOK SHELF.

Grundriss der Krystallographie für Studirende und zum Selbstunterricht. By Gottlob Linck. Pp. vi + 252, 482 figures, and 2 plates. (Jena: Gustav Fischer, 1896.)

THIS book makes no pretence at supplanting such well-known works as those of Groth and Liebisch, but is intended for the less advanced student, and more especially for the chemist, to whom the necessity of some knowledge of crystallography is becoming increasingly felt. Except in one important particular, little attempt is made to break away from old methods of treatment. The thirty-two classes of symmetry are not treated as independent, but crystal symmetry is distributed in the usual way into the six systems, and under each system are described the holohedral, hemihedral and tetartohedral forms. Both the Naumann and the Millerian symbols for the faces are used, but greater prominence is given to the former.

An important innovation, however, is made in the chapter on the optical characters of crystals. Here, we are glad to see, the author has followed the example of Prof. Groth and adopted the purely geometrical treatment involving the use of the "Optical Indicatrix," as devised by Mr. Fletcher.

The book is fairly evenly divided between the two sections dealing respectively with the geometrical and the physical characters of crystals, about a hundred pages being devoted to each. As it is not written for the advanced student, the subject of the calculation and graphic representation of crystals is not touched upon.

The book appears to be well adapted to the purpose for which it is intended. G. T. P.

Cyanide Processes. By E. B. Wilson, E.M. Pp. 116 (New York: John Wiley and Sons. London: Chapman and Hall, Ltd., 1896.)

IT is difficult to say with what object this little book has been written, and so it would perhaps be rash to assert that its object has not been attained. It is, at any rate, to be regretted that Mr. Wilson's work ever saw the light, as it is distinctly inferior to each of the half-dozen accounts which have already appeared of the cyanide process for the extraction of gold from its ores, and can only mislead and confuse those who expect to learn something from it. It is evident, from his own statements in the preface and elsewhere, that the author has derived much of his acquaintance with the subject from Patent Office literature, although he also claims to have read extracts from technical journals and other periodicals. He has not touched on mechanical details, but has confined himself to expounding the chemical principles of the process, which he appears to understand very imperfectly. The book is full of mistakes, such, for example, as that "the standard solution of cyanide contains from 0·5 to 1·5 per cent.," and that mercury oxidises quickly in the air at ordinary temperatures. On p. 74 it is stated that "the gold positive dissolves to the cyanide solution negative, with the result that the gold cyanide solution is positive. . . . Whether this electrolyte becomes converted into an electrode by absorbing the gold we are unable to say, but when they become 'cations' the gold is in the metallic state and the potassium cyanide is immediately set free." The book is well supplied with such statements as this. T. K. ROSE.

The Treatment of Phthisis. By Dr. Arthur Ransome, M.A., F.R.S. Pp. viii + 237. (London: Smith, Elder, and Co., 1896.)

MEDICAL men will be grateful for this treatise on the treatment of phthisical patients. The first part of the work comprises a general statement on the etiology pathology of phthisis, and the limits of infection; while the second part deals with the special and medicinal treatment of the malady. The contents are largely confined to descriptions of methods of treatment which have been personally used by the author, and results which have come under his own experience; but they, nevertheless, constitute a broad account of the nature and means of combating phthisis, and one which will give physicians brighter views as to the possibility of cure in the disease.

A Text-book of Applied Mechanics. Vol. I. By Alexander Jamieson, M.I.C.E., Professor of Electric Engineering in the Glasgow and West of Scotland Technical College, &c. Pp. 416. (London: Charles Griffin and Co., 1895.)

THE influence of Rankine is apparent here; the ground covered is much the same as in Rankine's "Applied Mechanics," but the treatment is more elementary, and the illustrative exercises and diagrams of a modern character.

If our writers of elementary school books on Mechanics, all copied from each other and almost exactly alike, could be persuaded to lift their eyes from their own pages and look elsewhere for novelty and reality, they would derive some profit from a treatise such as this. G.

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